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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/501,780

03/07/2005

John Domokos

038819.54980US

6582

23911 7590 08/17/2007  
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EXAMINER

HUANG, DAVID S

ART UNIT

PAPER NUMBER

2611

MAIL DATE

DELIVERY MODE

08/17/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/501,780	<b>Applicant(s)</b> DOMOKOS, JOHN	
	<b>Examiner</b> David Huang	<b>Art Unit</b> 2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 19 July 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 2, 5, 7-11 and 15 is/are rejected.
- 7) ☒ Claim(s) 3, 4, 6 and 12-14 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 July 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>19 July 2004</u> . | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Priority***

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### ***Information Disclosure Statement***

2. The information disclosure statement filed on July 19, 2004 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each cited foreign patent document; each non-patent literature publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the information referred to therein has not been considered.

### ***Specification***

3. The disclosure is objected to because of the following informalities: The specification lacks the proper section headings. Appropriate correction is required.

The following guidelines illustrate the preferred layout for the specification of a utility application. These guidelines are suggested for the applicant's use.

### **Arrangement of the Specification**

As provided in 37 CFR 1.77(b), the specification of a utility application should include the following sections in order. Each of the lettered items should appear in upper case, without underlining or bold type, as a section heading. If no text follows the section heading, the phrase "Not Applicable" should follow the section heading:

- (a) TITLE OF THE INVENTION.
- (b) CROSS-REFERENCE TO RELATED APPLICATIONS.
- (c) STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT.
- (d) THE NAMES OF THE PARTIES TO A JOINT RESEARCH AGREEMENT.
- (e) INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISC.
- (f) BACKGROUND OF THE INVENTION.

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- (1) Field of the Invention.
- (2) Description of Related Art including information disclosed under 37 CFR 1.97 and 1.98.
- (g) BRIEF SUMMARY OF THE INVENTION.
- (h) BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S).
- (i) DETAILED DESCRIPTION OF THE INVENTION.
- (j) CLAIM OR CLAIMS (commencing on a separate sheet).
- (k) ABSTRACT OF THE DISCLOSURE (commencing on a separate sheet).
- (l) SEQUENCE LISTING (See MPEP § 2424 and 37 CFR 1.821-1.825. A "Sequence Listing" is required on paper if the application discloses a nucleotide or amino acid sequence as defined in 37 CFR 1.821(a) and if the required "Sequence Listing" is not submitted as an electronic document on compact disc).

#### *Claim Objections*

4. **Claims 1-15** are objected to because of the following informalities: The amendments provided by applicant do not adhere to 37 CFR 1.121(c) (2) in that the text of any deleted matter must be shown by strike-through except that double brackets placed before and after the deleted characters may be used to show deletion of five or fewer consecutive characters. All instances in which individual reference characters are deleted contain 6 characters due to the parentheses surrounding the four digit reference numbers. It would appear from the current amendments made to the claims that applicant intended to remove all reference numbers; however, in **claim 7**, line 4 and **claim 10**, line 10, the reference numbers have not be deleted.

**Claim 8** is also objected to since it recites a limitation for "a further adder" in a claim that has no other adders. This should be corrected to avoid confusion.

Appropriate correction is required.

#### *Claim Rejections - 35 USC § 103*

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are

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such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. **Claims 1, 2, 5, 7, 9, 10, 11, and 15** are rejected under 35 U.S.C. 103(a) as being unpatentable over Girard (cited in IDS) in view of Wright et al. (US Patent Application Publication 2002/0044014).

Regarding **claims 1 and 10**, Girard discloses a compensating apparatus and method for compensating for intermodulation products, the apparatus comprising:

a phase splitting unit, which splits an input RF signal into an in-phase component and a quadrature component (in-phase component X and quadrature phase component Y of the baseband signal, column 1, lines 46-48, Figure 1; the splitter is inherent);

first multiplying units, which square the value of the in-phase component and the quadrature component respectively (7, 8, Figure 1);

a first summer which sums the squared values to generate an  $X^2$  signal (9, Figure 1);

combining units, which respectively combine the in-phase component and the quadrature component with respective predistorting coefficients (variable attenuators 13 and 14, Figure 1); and

an adder (19, 20, Figure 1), which generates a predistorted RF signal from the output of the combining units.

However, Girard fails to expressly disclose combining units, which respectively combine the  $X^2$  signal and an external signal with respective predistorting coefficients.

Wright et al. disclose a Digital Compensation Signal Processor (DCSP 52, Figure 8) that permits increased control over weak nonlinear effects by introducing a nonlinear FIR filter kernel into the forward data path. The compensation circuit in this embodiment includes multiple

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FIR filters 52A, one of which processes the wideband input signal, and the others of which each independently filter a respective higher order multiple or function of the wideband input signal. The outputs of the FIR filters are summed to generate the compensated signal (page 9, [0195]).

Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made, to provide the circuit taught by Girard with the DCSP taught by Wright et al. since it improves performance by increasing control over weak nonlinear effects (page 9, [0195]) and preventing bias voltages from becoming modulated with the input modulation signal information bearing envelope (page 9, [0194]).

Regarding **claims 2 and 11**, Girard discloses everything claimed as applied to claims 1 and 10 above, and further disclose the combining units comprise fifth and sixth combining units, the fifth combining unit combining the in-phase component with a fifth predistorting coefficient;

the sixth combining unit combining the in-phase component with a sixth predistorting coefficient.

However, Girard fails to expressly disclose the combining units comprise first to fourth combining units, the first combination unit combining the  $X^2$  signal with a first predistorting coefficient; the second combining unit combining the  $X^2$  signal with a second predistorting coefficient; the third combining unit combining the external signal with a third predistorting coefficient; the fourth combining unit combining the external signal with a fourth predistorting coefficient;

Wright et al. discloses an FIR filter (Figure 6A, tap 0 and 1 coefficients and respective multipliers) in which the tap coefficients and delay periods between taps are fully adjustable by

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the ACPCE. If each filter is regarded as an  $n$ th order kernel (specifically  $2^{\text{nd}}$  order,  $X^2$ ), the structure permits any linear or nonlinear function of the past input power profile to be computed (pages 8-9, [0190]). Wright et al. also disclose FIR filter 52A that combine external ( $X^4$ ) signals with tap coefficients in the same way.

Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made, to provide the circuit taught by Girard with the FIR filter taught by Wright et al. for increased versatility (pages 8-9, [0190]).

Regarding **claim 5**, Girard and Wright et al. disclose everything claimed as applied to claim 1 above, but fail to expressly disclose wherein the apparatus is an application specific integrated circuit.

Nevertheless, an ASICs are well known in the art and it would have been obvious to one of ordinary skill in the art to implement the circuit taught by Girard and Wright et al. as an ASIC to reduce the size of the circuit.

**Regarding claims 7 and 15**, Girard and Wright et al. disclose everything claimed as applied to claim 1 above, but fail to expressly disclose the apparatus and method comprising a further multiplier, which squares the  $X^2$  signal again to give a  $X^4$  signal, wherein the external signal is the  $X^4$  signal.

Nevertheless, Wright discloses the fourth order term (Figure 8,  $X^4$ ) connected to a summer via an FIR filter. Furthermore, Wright et al. teach that the  $2^{\text{nd}}$  order kernel is generated by squaring the  $x(t)$  signal (as depicted in Figure 6A).

Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made, to provide the circuit taught by Girard with the FIR filter taught by Wright

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et al. for increased versatility (pages 8-9, [0190]). Furthermore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to duplicate the squaring structure of  $x(t)$  for  $x^2(t)$  since it has been held that mere duplication of essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co.*, 193 USPQ 8.

Regarding **claim 9**, Wright et al. disclose a feed forward amplifier arrangement comprising:

an amplifier (PA) having non-linear transfer characteristics that distort signals amplified thereby, the amplifier being coupled to the output of a compensating apparatus (60, Figure 1);

a controller (PIC) which generates coefficients for feeding into the compensating apparatus (70, Figure 1); and

a sampling means which samples an output signal from the amplifier and which feeds the sample back to the controller (ADC 68).

However, Wright et al. fail to expressly disclose a compensating apparatus (APE) as claimed in claim 1.

Nevertheless, Girard and Wright et al. teach the compensating apparatus as claimed in claim 1 (see rejection of claim 1).

7. **Claim 8** rejected under 35 U.S.C. 103(a) as being unpatentable over Girard (cited in IDS) in view of Matsuura et al. (US Patent Application Publication 2001/0048346).

Regarding **claim 8**, Girard discloses a hybrid compensating apparatus for substantially simultaneously compensating for both carrier frequency and envelope frequency dependent effects due to IM3 products, the hybrid apparatus comprising:



a first compensating apparatus, arranged to compensate for envelope frequency effects (envelope predistortion 4, Figure 1);

a second compensating apparatus, arranged to compensate for carrier frequency effects (phase predistortion 5, Figure 1);

However Girard fails to expressly disclose a carrier delay unit, which imposes a predetermined delay upon the RF input signal supplied to the second compensating apparatus; an adder which sums the outputs of the first and second compensating apparatuses; and that the first compensating apparatus comprises an ASIC;

Matsuura et al. disclose a predistortion circuit (Figure 16; delay circuit 1610, vector adjustment circuit 1615, and combiner 1617), in which the phase of a distortion on the high-frequency side and the low-frequency side is controlled independently and is therefore effectively used for a power amplifier having an unbalanced distortion characteristic. Because both Girard and Matsuura et al. teach devices for phase predistortion, it would have been obvious to one skill in the art to substitute one method for the other to achieve the predictable result of phase predistortion.

However, the combination of Girard and Matsuura et al. fails to expressly disclose the first compensating apparatus comprises an ASIC. Nevertheless, an ASICs are well known in the art and it would have been obvious to one of ordinary skill in the art to implement the circuit taught by Girard and Matsuura et al. as an ASIC to reduce the size of the circuit.

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*Allowable Subject Matter*

8. **Claims 3, 4, 6, 12, 13, and 14** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

*Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Huang whose telephone number is (571) 270-1798. The examiner can normally be reached on Monday - Friday, 8:00 a.m. - 5:00 p.m., EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shuwang Liu can be reached on (571) 272-3036. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

DSH/dsh  
14 August 2007



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